

the zipperlike seals on plastic bags commonly used to store food. The cathode and anode plates include current collectors, the inside ends of which are electrically connected to the electrodes and the outer ends of which can be used to form the desired series and/or parallel electrical connections among the cells. Because the stack need not be clamped or otherwise held together under pressure, the stack can

easily be disassembled to replace a malfunctioning sealed unit.

*This work was done by Sekharipuram Narayanan and Thomas Valdez of Caltech for **NASA's Jet Propulsion Laboratory**. Further information is contained in a TSP (see page 1).*

*In accordance with Public Law 96-517, the contractor has elected to retain title to this invention. Inquiries concerning rights for its commercial use should be*

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*Intellectual Assets Office*

*JPL*

*Mail Stop 202-233*

*4800 Oak Grove Drive*

*Pasadena, CA 91109*

*(818) 354-2240*

*E-mail: [ipgroup@jpl.nasa.gov](mailto:ipgroup@jpl.nasa.gov)*

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## Highly Efficient Vector-Inversion Pulse Generators

*Marshall Space Flight Center, Alabama*

Improved transmission-line pulse generators of the vector-inversion type are being developed as lightweight sources of pulsed high voltage for diverse applications, including spacecraft thrusters, portable x-ray imaging systems, impulse radar systems, and corona-discharge systems for sterilizing gases. In this development, more than the customary attention is paid to principles of operation and details of construction so as to maximize the efficiency of the pulse-generation

process while minimizing the sizes of components. An important element of this approach is segmenting a pulse generator in such a manner that the electric field in each segment is always below the threshold for electrical breakdown. One design of particular interest, a complete description of which was not available at the time of writing this article, involves two parallel-plate transmission lines that are wound on a mandrel, share a common conductor, and are switched in such

a manner that the pulse generator is divided into a "fast" and a "slow" section. A major innovation in this design is the addition of ferrite to the "slow" section to reduce the size of the mandrel needed for a given efficiency.

*This work was done by M. Franklin Rose of Radiance Technologies, Inc., for **Marshall Space Flight Center**. Further information is contained in a TSP (see page 1).*  
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